

PATENT ABSTRACTS OF JAPAN

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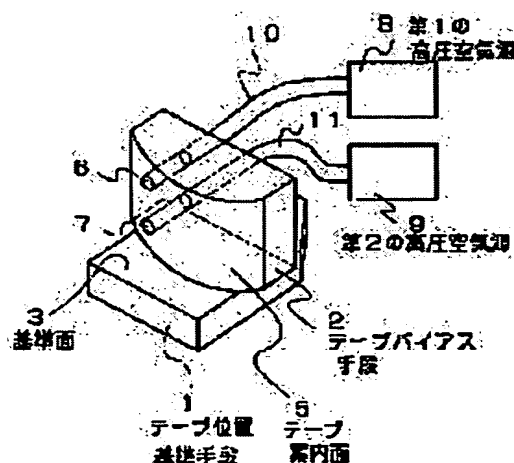
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(54) TAPE GUIDING DEVICE



(57)Abstract:

PROBLEM TO BE SOLVED: To realize a tape guiding device for making a running route of a magnetic tape be biased in the width direction of the magnetic tape without giving strong tensile force to the magnetic tape.

SOLUTION: A magnetic tape is guided along a tape guiding surface 5 of a tape biasing means 2. On the tape guiding surface 5 air blowing-out holes 6, 7 and others are provided. The air blowing-out holes are so prepared as to get different amount of air according to the width direction of the magnetic tape. Therefore, the running route of the magnetic tape is biased toward the reference surface 3 of a reference

means 1 for the position of tape.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] With a record means, this invention relates to the tape guide apparatus for guiding a tape so that the mechanical record pattern of the signal recorded on the tape may become accuracy, when recording a signal on a tape.

[0002]

[Description of the Prior Art] The magnetic tape is widely used as a record medium for recording and saving the information on a computer etc. The general technical problem in the case of recording a signal on a magnetic tape is to raise [how] the recording density of the information per unit area. If the recording density of the information per unit area can be raised, there are an advantage that the information on a large quantity is recordable on a small record medium, and an advantage that the transfer rate (informational recording rate) of the information on a tape can be raised.

[0003] In order to raise the recording density per unit area of a magnetic tape, technical amelioration more nearly various than before is added. When conventional high density tape-recording equipment raises the machining precision of a tape traveller, improvement in recording density has been aimed at. For example, when recording a signal on a magnetic tape using the magnetic head, many recording tracks are formed along with the longitudinal direction of a magnetic tape. If width of face of a truck is made thin and track density which is the distance of a truck and a truck is made [many], the recording density of the information per unit area will improve. However, when reproducing the signal recorded as making width of face of a truck thin extremely, the problem that it becomes difficult for the reproducing head to trace a truck thoroughly occurs. Therefore, even if it improves the tape traveller only depending on the machining precision of a tape traveller, width of face of a truck is made thin, or there is a limit in raising the recording density by raising track density.

[0004] On the other hand, in addition to the amelioration as the conventional tape traveller with the latest, same high density tape-recording equipment, the mechanism of the servo control by the servo track has come to be incorporated. It enables it to trace the truck on a tape thoroughly with the mechanism of servo control by controlling the location of a recording head or the reproducing head to the magnetic tape it runs. The magnetic tape used with the tape-recording equipment which uses

servo control records the servo pattern beforehand on the tape. A servo pattern is a pattern used as the criteria of the position control of a recording head or the reproducing head. A recording head and the reproducing head determine the location of a track on the basis of a servo pattern, and trace a track. If it does so, it will become possible to be able to make width of face of a track thin to a limit, and to make the gap of a track and a track very narrow.

[0005] By the way, on a tape, I hear that it forms a servo pattern in accuracy that it is the most important in the tape used for the tape-recording equipment which uses servo control in this way, and it is in it. This is because a servo pattern is used as all criteria. In order to form a servo pattern on a tape, the equipment of dedication of a servo writer is used by the manufacturing process of a tape. I hear that it is made for a function required for a servo writer to run at an exact speed of a tape, and it records a servo pattern with a sufficient precision, and there is. In order to record especially a servo pattern with a sufficient precision, the tape traveller designed specially is indispensable. A tape guide apparatus plays a role important for securing the travelling accuracy of a tape in a servo writer. A tape guide apparatus has the role which positions to accuracy the tape it runs on a servo writer to the write-in arm head of a servo pattern.

[0006] The mechanism of the tape guide apparatus considered that the inclusion to a servo writer is possible is known partly conventionally. While applying the bias which energizes a tape to an one direction on both sides of the magnetic head to JP,57-16119,U and JP,61-150153,A (G11B15/60), the mechanism that the tracking of a high precision is acquired is shown by by regulating by the tape guide. Moreover, the example which used the tape guide apparatus which became taper-like for carrying out bias of the transit path of the magnetic tape it runs to JP,04-132613,U (G11B5/86) is indicated.

[0007]

[Problem(s) to be Solved by the Invention] The tape traveller considered to be usable by the servo writer known conventionally had the technical problem which applies tension strong against the magnetic tape it is running were required, when it was fully going to carry out bias of the transit path of a magnetic tape. This cause is because these equipments carry out bias of the transit path of a magnetic tape with the difference of the tension of the cross direction of a magnetic tape. When the tension of a magnetic tape is too strong, a tape guide apparatus may do breakage to the front face and edge of a magnetic tape. Even if tension of this invention is not strong, it offers the tape guide apparatus with which the bias of the transit path of enough

magnetic tapes is obtained.

[0008]

[Means for Solving the Problem] In a tape guide apparatus for this invention to guide transit of a magnetic tape So that said magnetic tape it runs may contact a tape datum reference means to decide a location of an edge of one side of said magnetic tape it runs at said tape datum reference means It consists of tape bias means to guide a transit path of said magnetic tape, and let said bias means be the tape guide apparatus characterized by performing bias of a transit path of said magnetic tape it runs by spraying high voltage air on said magnetic tape it runs. Furthermore, said bias means gives a difference crosswise [of said magnetic tape] for a flow rate of said high voltage air sprayed crosswise [of said magnetic tape], and uses it as a tape guide apparatus characterized by carrying out bias of the transit path of said magnetic tape it runs.

[0009]

[A mode of implementation of invention] Drawing 1 is explanatory drawing explaining an outline of a tape guide apparatus in which this invention was carried out. 1 is a tape datum reference means and 2 is a tape bias means. The tape datum reference means 1 and the tape bias means 2 are combined with one. The tape datum reference means 1 is equipped with the datum level 3 finished flat and smooth. The tape bias means 2 is equipped with the tape slideway 5 which has a vertical field to datum level 3. On the whole, the tape slideway 5 is curving. The 1st hole 6 and 2nd hole 7 are established in the tape slideway 5. 8 is the 1st high voltage air supply, and 9 is the 2nd high voltage air supply. The 1st hole 6 and 2nd hole are having the respectively same structure, and are located in a line up and down to datum level 3. The 1st hole 6 is connected to the 1st high voltage air supply 8 by the 1st tube 10, and the 2nd hole 7 is connected to the 2nd high voltage air supply 9 by the 2nd tube 11.

[0010] Drawing 2 is the plan of a tape transit system containing a tape guide apparatus shown in drawing 1 . 12 is a magnetic tape. A magnetic tape 12 runs in the direction shown in an arrow head 13. 14 is the tape guide put on the upstream of the tape datum reference means 1 and the tape bias means 2. The tape guard 14 shows around so that a magnetic tape 12 may flow into the tape datum reference means 1 and the tape bias means 2 at an angle of predetermined. 15 is for example, a write-in arm head. The write-in arm head 15 is in a lower stream of a river of the tape datum reference means 1 and the tape bias means 2, and writes a magnetization pattern in a magnetic tape 12.

[0011] Drawing 3 is the front view of the tape datum reference means 1 and the tape

bias means 2 shown in drawing 2 . 16 is the soffit (edge) of a magnetic tape 12. 17 is the upper bed (edge) of a magnetic tape 12. The soffit 16 of a magnetic tape 12 and an upper bed 17 did, and the 1st hole 3 and 2nd hole 7 are located in a line up and down. [0012] Drawing 4 is the side elevation of the tape datum reference means 1 and the tape bias means 2 shown in drawing 2 . The 1st high voltage air supply 8 and the 2nd high voltage air supply 9 which were shown in drawing 1 differ from each other in a flow rate. Air which flows out of the 1st hole 6 is an arrow head 18, and an arrow head 19 shows air which flows out of the 2nd hole 7. A flow rate of air which blows off from the 1st hole 6 in an example shown in drawing 4 is larger than a flow rate of air which blows off from the 2nd hole 7. If it does so, bias of the transit path of a magnetic tape 12 will be carried out in the direction shown by arrow head 20. that being right, then a 12 magnetic tape soffit 16 are always suppressed in datum level 3. Magnitude of force of bias changes with a flow rate of air which blows off from tension and the 1st hole 6 of a magnetic tape 12, and the flow rates of air which blows off from the 2nd hole 7. [0013] Drawing 5 measures the effect about an example of this invention. First, if a measuring method is explained, 22 shown in drawing 3 will be a light transmission-type measuring instrument. 23 is amplifier which amplifies an output of the light transmission-type measuring instrument 22 as voltage, and 24 is a voltmeter which measures output voltage of amplifier 23. The light transmission-type measuring instrument 22 measures an oscillation of the vertical direction of the soffit 16 of a magnetic tape 12 by change of the quantity of light. The light transmission-type measuring instrument 22 is arranged so that abbreviation one half of the quantity of light to measure may penetrate near the tape datum reference means 1. To a measuring instrument 22, if a magnetic tape 12 shifts upwards, output voltage of a measuring instrument 22 will rise, and if a magnetic tape 22 shifts downward, output voltage of a measuring instrument 22 will decline. As a measuring instrument 22, LZX-110 mold of KEYENCE CORP., LZX-V10 mold, etc. can be used, for example. A Measuring condition at this time is a magnetic tape for [magnetic tape / 12] data cartridges of 9micro meter in width of face of 1/2 inch, and thickness, and a travel speed of a magnetic tape 12 is [tension of a tape] about 1 N 5 meter and per second. Drawing 5 (a) is an example of a comparison in case there is no air which blows off from the 1st hole 6 and 2nd hole 7 which are shown in drawing 3 , and drawing 5 (b) shows an example at the time of blowing off the 2nd hole 7 to high voltage air from the 1st hole 6. In drawing 5 (a) and (b), an axis of ordinate is voltage and a horizontal axis is time amount. In the case of drawing 5 (a), the tape bias means 2 has an operation equivalent to the conventional tape guide, and bias of the transit of a magnetic tape 2

is not carried out. Therefore, it turns out that a magnetic tape 2 is vibrating by comparatively big oscillating width of face during transit. In the case of drawing 5 (b), bias of the transit path of a magnetic tape 12 is carried out by high voltage air. Consequently, the soffit 16 of a magnetic tape 12 comes to contact datum level, and it turns out that an oscillation of the vertical direction is controlled.

[0014] Drawing 6 is the mode of other operations of this invention. The tape bias means 2 is equipped with the hole 38 for blowing off air in a mode shown in drawing 6. A hole 38 is arranged in the direction which is located in a location which shifted from a center of a magnetic tape 12, and is left with the tape datum reference means 1. It connects with a high voltage air supply which is not illustrated, and a hole 38 sprays high voltage air on the magnetic tape 12 which runs the tape bias means 2. If it does so, bias of the transit path of a magnetic tape 12 will be carried out towards the tape datum reference means 1. Since the number of holes which blow off high voltage air is one, a difference from a mode of operation shown in drawing 1 has the advantage that structure becomes easy. Although a technical problem which this invention fully tends to solve is solvable even if it is the mode of operation shown in drawing 6, area to which a magnetic tape 12 contacts the tape bias means 2 as compared with a mode of operation shown in drawing 1 increases.

[0015] Drawing 7 is the mode of other operations of this invention. Although the tape bias means 2 shown in drawing 1 showed an example which prepares two holes, the 1st hole 6 and the 2nd hole 7, the tape bias means 2 shown in drawing 7 prepares four holes of holes 25, 26, 27, and 28. In this case, it is good to divide four holes into two groups, to connect 25 and 26 to 27 and to connect the 1st group and 28 to a high voltage air supply with a pressure higher than the 2nd group's holes 27 and 28 from the 1st group's holes 25 and 26 as the 2nd group. If it does so, the time when a travel speed of a magnetic tape 12 is slow, and even when tension of a magnetic tape 12 is comparatively high, bias of a transit path of enough magnetic tapes 12 will be obtained, for example. Moreover, the magnetic tape 12 which passes the tape bias means 2 is in an inclination which surfaces from the tape bias means 12 with air which blows off from holes 25, 26, 27, and 28, and has the advantage that a touch area of the tape bias means 2 and a magnetic tape 12 decreases. When there are few touch areas, there is an advantage whose breakage on the magnetic tape 12 by the tape bias means 2 and contact of a magnetic tape 12 decreases.

[0016] Drawing 8 is the mode of another operation of this invention. The tape bias means 2 shown in drawing 8 arranges many holes 29 in the tape slideway 5. Those with two kind and one kind arrange many numbers in a portion near the upper bed 17 of a

magnetic tape 12 at arrangement of many holes 29, as shown at drawing 8 , and a small number is arranged in a portion near a soffit 16. If it does in this way, even if it connects a high voltage air supply of the same pressure to all the holes 29, bias of the transit path of a magnetic tape 12 will be carried out towards the tape datum reference means 1. Other one kind has a method of arranging many holes in the tape slideway 5 rather than the hole 29 further shown in drawing 8 . In this case, it is good to change a pressure of high voltage air which divides into two groups of the upper and lower sides of a hole, and is supplied to each group. That is, a high voltage air supply of a high pressure is connected by group near the upper bed 17 of a magnetic tape 12, and a low high voltage air supply is connected to a group near a soffit 16. If it does so, bias of the transit path of a magnetic tape 12 will be carried out towards the tape datum reference means 1. As compared with a mode which showed a mode shown in drawing 8 to drawing 7 , it is the travel speed of the later magnetic tape 12, or even when tension of a magnetic tape 12 is more high, bias of sufficient transit path is obtained. Moreover, even if it compares with a mode of operation shown in drawing 7 , while a magnetic tape 12 runs, it stops almost contacting the tape slideway 5, and there is an advantage that breakage on the magnetic tape 12 under transit decreases more.

[0017] Drawing 9 is the mode of operation of other this inventions. In an example shown in drawing 9 , the tape bias means 2 is equipped with the 1st hole 30 and 2nd hole 31 in a transit path of a magnetic tape 12. Near and a hole 31 of a hole 30 are close to the soffit 16 of a magnetic tape 12 to the upper bed 17 of a magnetic tape 12. A path of a hole 30 is larger than a path of a hole 31. When a hole 30 and a hole 31 are connected to the same high voltage air supply, there are many amounts of air which blows off from a hole 30. Therefore, if it is the tape bias means 2 of a mode as shown in drawing 9 , it is possible to perform bias of a transit path of a magnetic tape 12 by one high voltage air supply.

[0018] Drawing 10 is the mode of operation of other this inventions. The tape bias means 2 shown in drawing 10 is equipped with the holes 33 and 34 perpendicularly located in a line in a transit path of a magnetic tape 12. A hole 33 is located in a location near the upper bed 17 of a magnetic tape 12, and a hole 34 is located in a location near a soffit 16. A different point from a mode of operation shown in drawing 1 is a point that holes 33 and 34 are slots along the transit direction of a magnetic tape 12. Although the tape slideway 5 generally carries out a front face and the smoother possible one is desirable, a hole established in the tape slideway 5 tends to serve as an obstruction of transit of a magnetic tape 12. If a hole is large beyond need,

breakage may be done to a magnetic tape 12. A mode of operation shown in drawing 10 can make a failure of transit of the magnetic tape 12 by holes 33 and 34 into the minimum, after securing the amount of blowdown of sufficient air by making holes 33 and 34 into a slot. When holes 33 and 34 are the same configurations in the case of a mode shown in drawing 10 , high-pressure high voltage air is supplied by hole 33. If it does so, bias of the transit path of a magnetic tape 12 will be carried out towards the tape datum reference means 1. Moreover, when making into the same pressure a high voltage air supply supplied to holes 33 and 34, even if it lengthens a hole 33 horizontally or is made to make width of face perpendicularly large so that area of a hole 33 may spread compared with a hole 34, an effect of same bias is acquired.

[0019] Drawing 11 is the mode of other operations of this invention. An example shown in drawing 1 showed an example which the tape datum reference means 1 and the tape bias means 2 consist of as one. In drawing 11 , the tape datum reference means 1 and the bias means 2 are left and attached on a base plate 35. Moreover, the tape datum reference means 1 is arranged to the transit direction of a magnetic tape 12 at the downstream of the tape bias means 2. Although a mode of operation, an operation, and an effect which showed substantially a mode of operation shown in drawing 11 by drawing 1 are the same, it becomes possible to arrange the magnetic head which is not illustrated since there is no tape bias means 2 on the tape datum reference means 1.

[0020] Drawing 12 is the mode of other operations of this invention. A difference from a mode of operation shown in drawing 11 is the point that a portion equivalent to the tape datum reference means 1 shown by drawing 11 consists of two, the 1st tape datum reference means 36 and the 2nd tape datum reference means 37. In a mode of operation shown by drawing 11 from drawing 1 , the tape datum reference means 1 showed an example equipped with the tape datum level 3 finished flat and smooth. However, if positioning of the soffit 16 of a magnetic tape 12 is possible for the tape datum reference means 1, it is sufficient, and as shown in drawing 12 , a tape datum reference means may be divided or more into two like 36 and 37.

[0021] In addition, a mode of much operations can be considered also to everything but a mode of operation mentioned above. First, if it was in a tape guide apparatus shown in drawing 1 and drawing 4 , the datum plane 3 of the tape datum reference means 1 and the tape slideway 5 of the tape bias means 2 showed a right-angled example. However, the tape slideway 5 shown in drawing 4 depending on the case may be ***** (ed) counterclockwise slightly. If it does so, an amount of air which blows off from the 1st hole 6 is reducible. In the case of a magnetic tape for width of face of

0.5 inches and thickness to record a digital signal whose magnetic tape 12 is 9 micrometers only whenever [this tilt-angle], when making it run by 5 meters per second, it is good at about 15 degrees from 2 times. Moreover, for example, although the 1st high voltage air supply 8 and the 2nd high voltage air supply 9 which were shown in drawing 1 were explained as a separate configuration, components for controlling a pressure and a flow rate of air are supplied from many components distribution companies. Therefore, since air supplied from one high voltage air supply can be freely adjusted if these components are attached, a function of the 1st high voltage air supply 8 and the 2nd high voltage air supply 9 can be actually given according to one high voltage air supply. Moreover, an example of measurement shown in drawing 5 is measured under previous conditions. It is common that optimal conditions differ "Resemble a condition of a front face of width of face of a magnetic tape 12, thickness, a raw material, and a magnetic tape 12, a raw material of the tape bias means 2 and process tolerance, and tension and a travel speed of a magnetic tape 12 actually." As for this, it is desirable to determine a mode of the optimal operation, measuring actually.

[0022]

[Effect] Even if tension of this invention is not strong, it is effective in the tape guide apparatus with which the bias of the transit path of enough magnetic tapes is obtained being realizable.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Explanatory drawing explaining the configuration of the mode of operation

[Drawing 2] The plan explaining the mode of operation

[Drawing 3] Front view having shown the mode of operation

[Drawing 4] The side elevation explaining the mode of operation

[Drawing 5] The graph explaining an effect

[Drawing 6] Explanatory drawing of the mode of other operations of this invention

[Drawing 7] Explanatory drawing of the mode of other operations of this invention

[Drawing 8] Explanatory drawing of the mode of other operations of this invention

[Drawing 9] Explanatory drawing of the mode of other operations of this invention

[Drawing 10] Explanatory drawing of the mode of other operations of this invention

[Drawing 11] Explanatory drawing of the mode of other operations of this invention

[Drawing 12] Explanatory drawing of the mode of other operations of this invention

[Description of Notations]

1 Tape Datum Reference Means

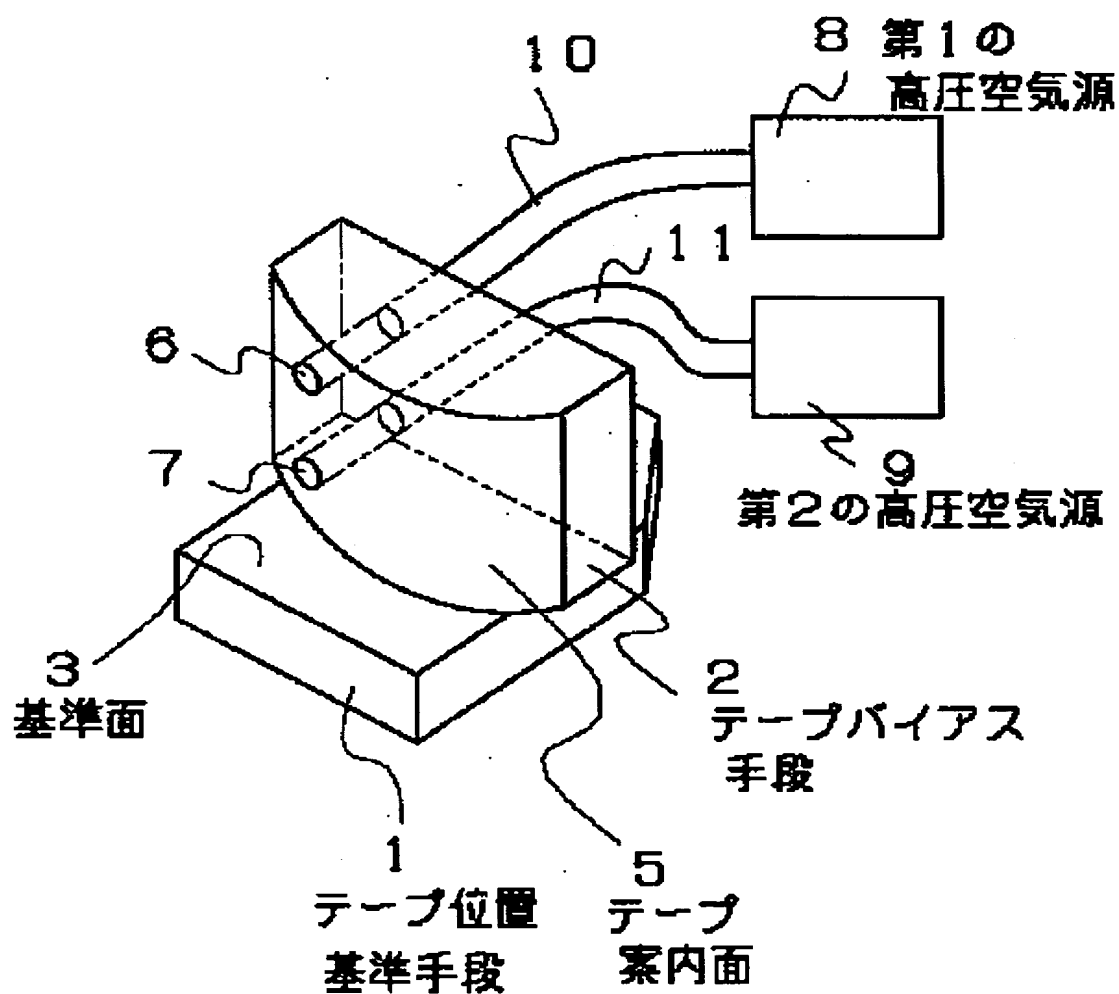
2 Tape Bias Means

3 Datum Level

5 Tape Slideway

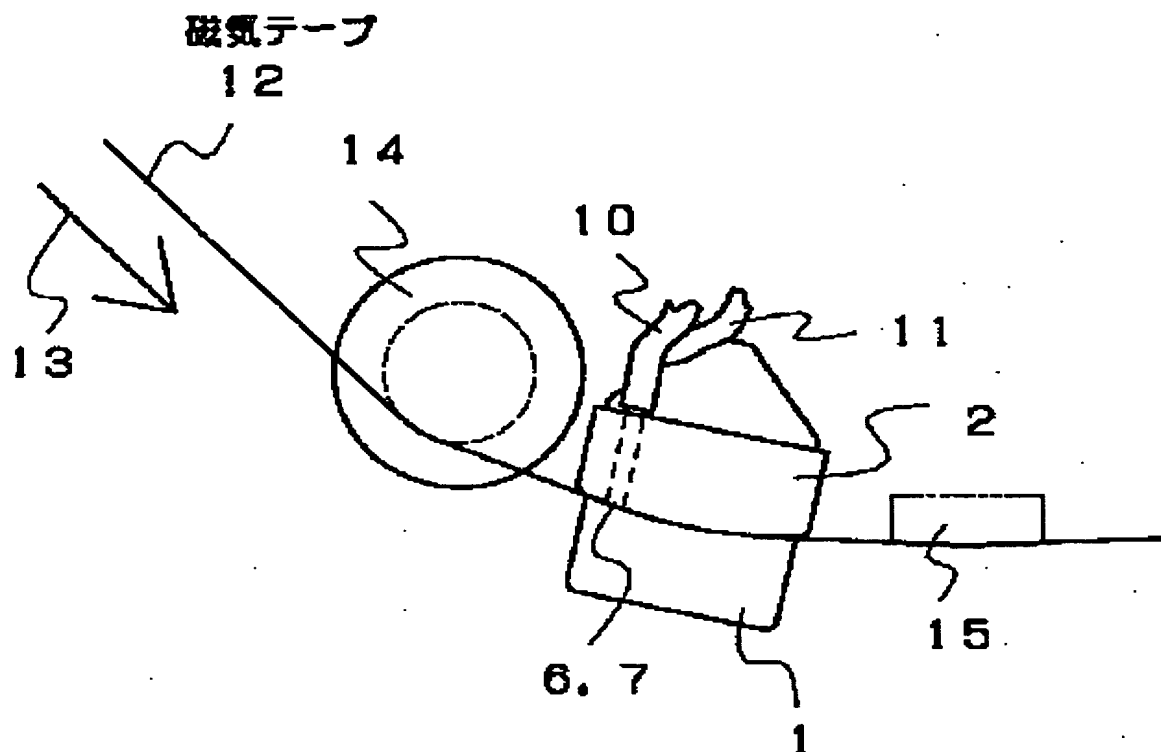
DRAWINGS

[Drawing 1]

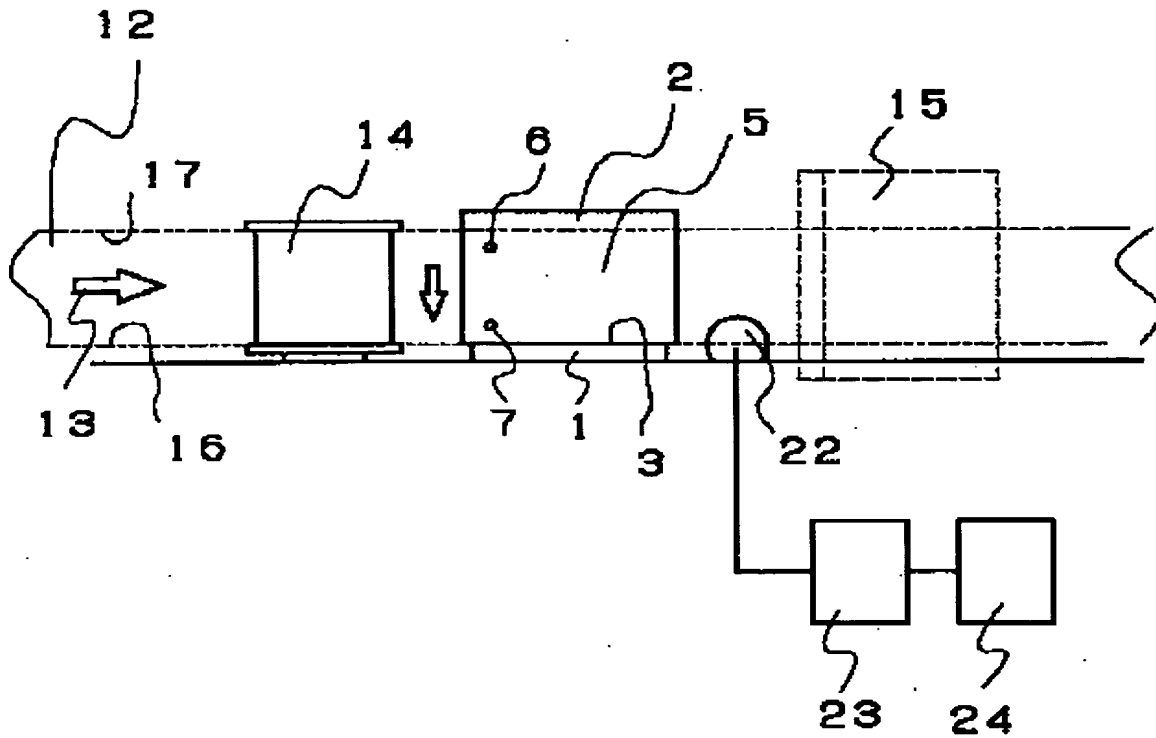


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[Drawing 2]



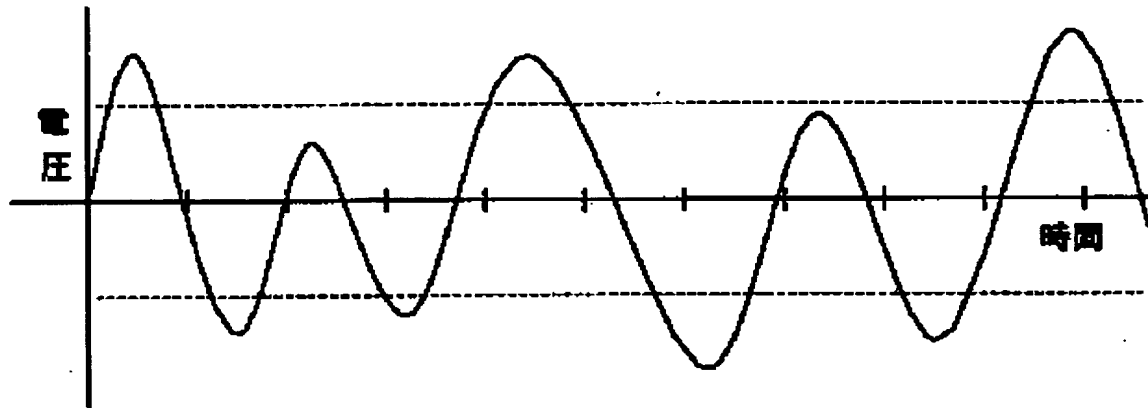
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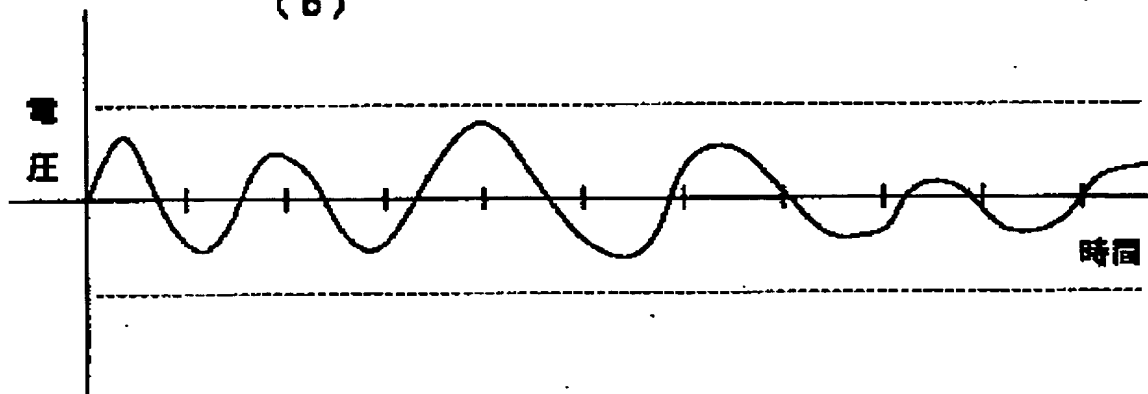
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[Drawing 4]

(a)

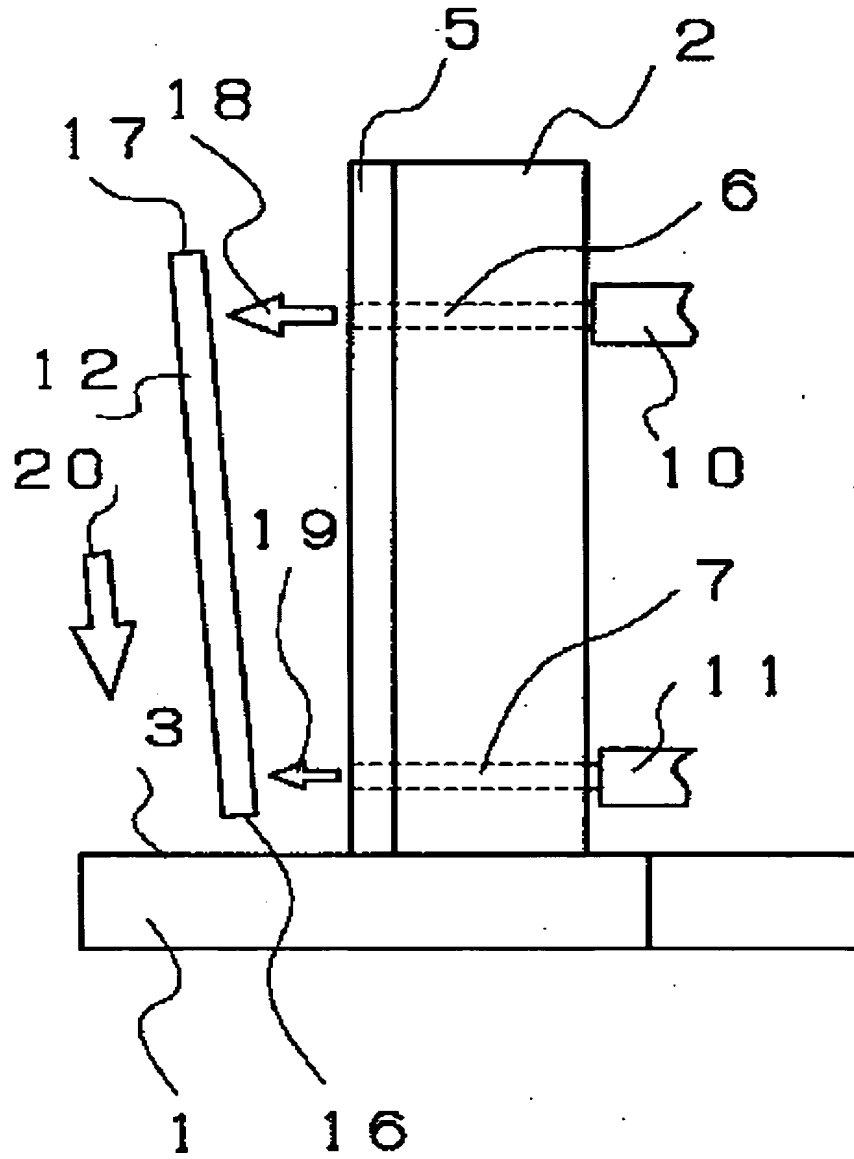


(b)



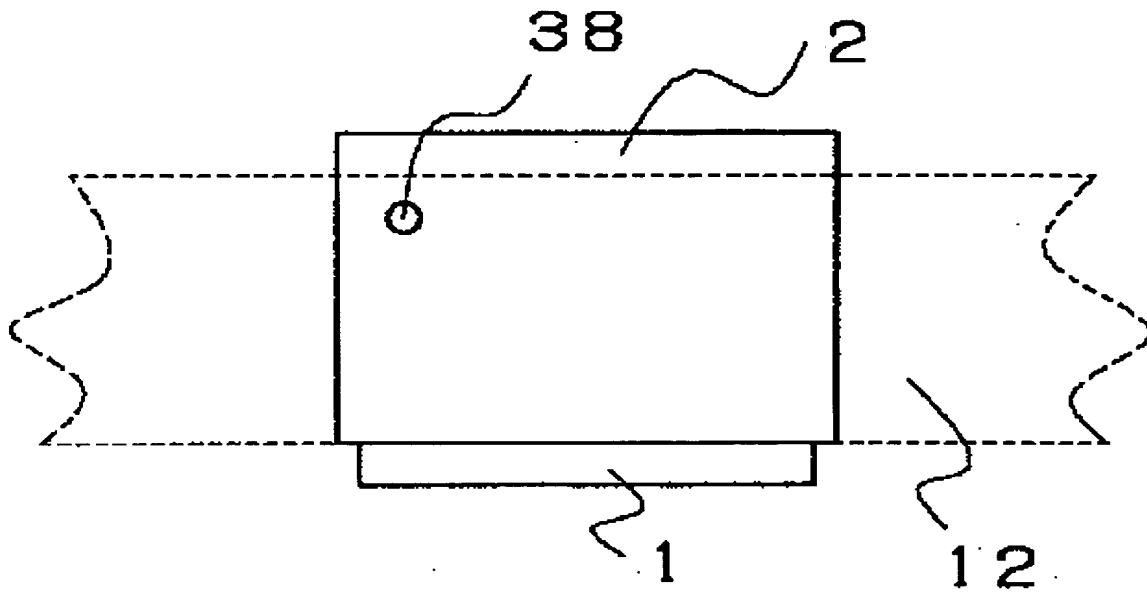
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[Drawing 5]

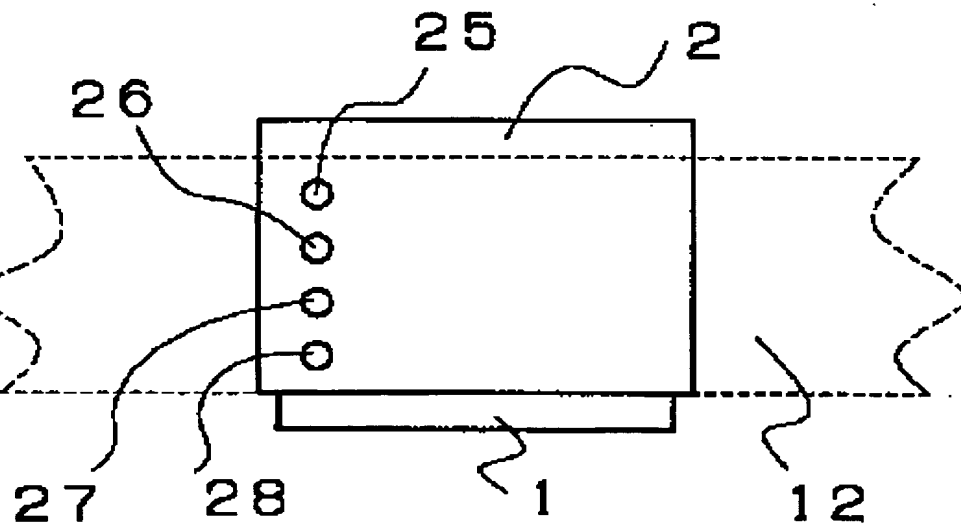


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[Drawing 6]

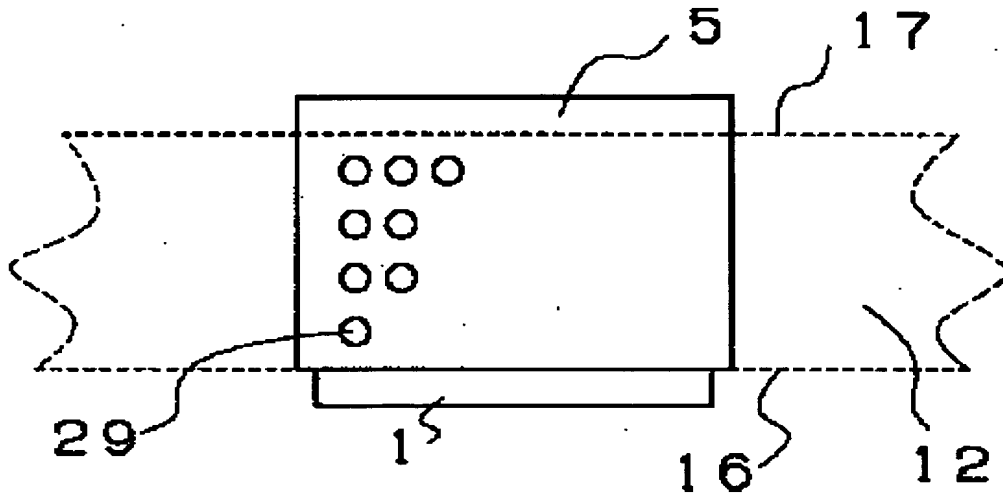


[Drawing 7]

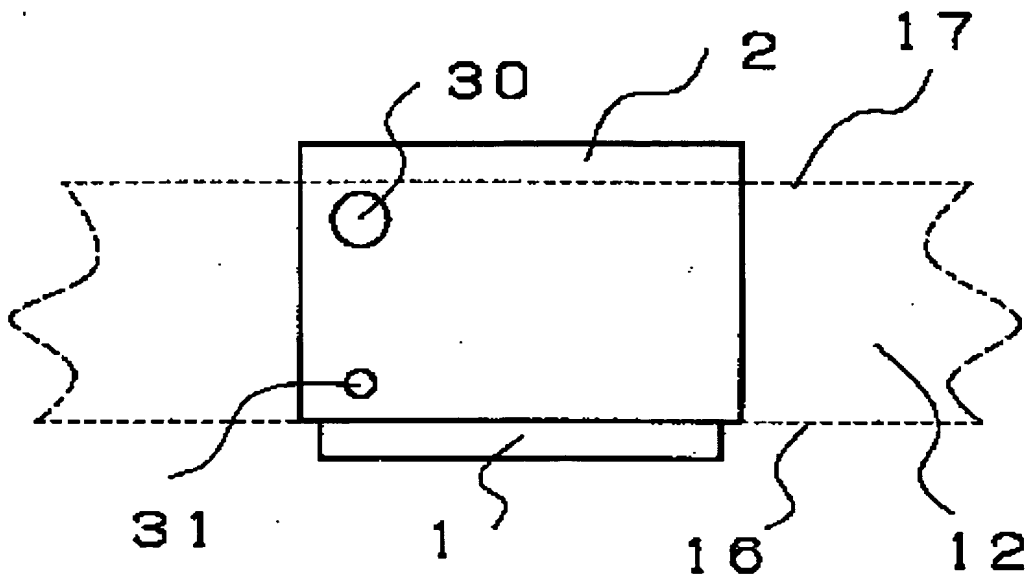


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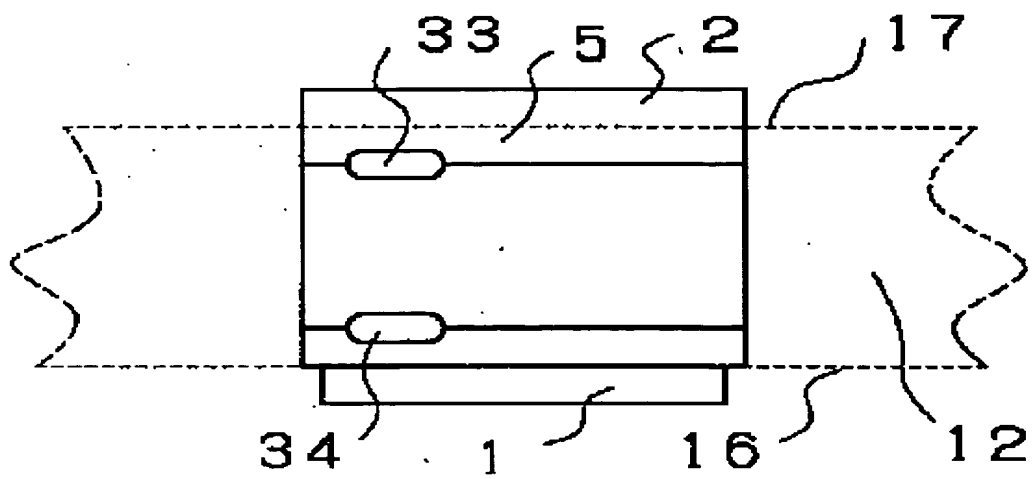
[Drawing 8]



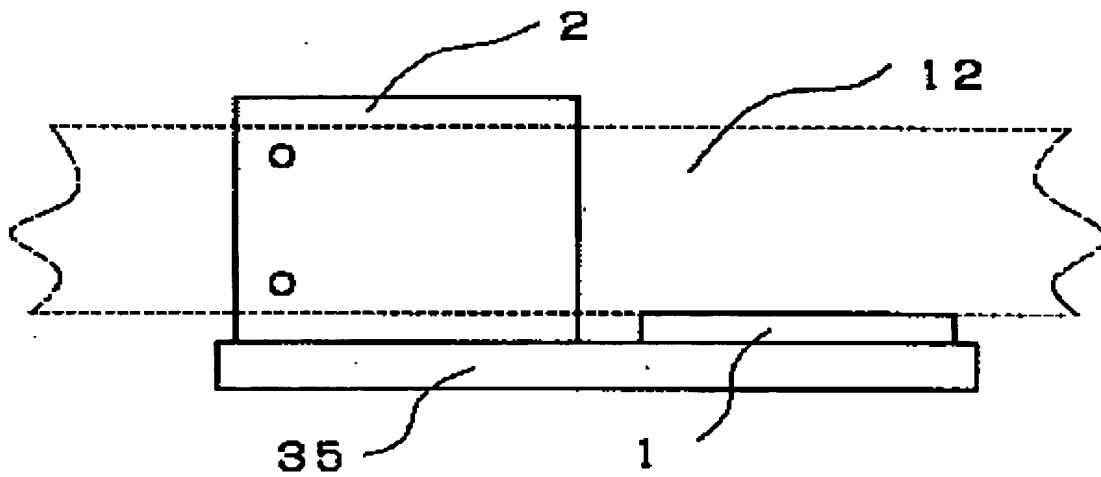
[Drawing 9]



[Drawing 10]

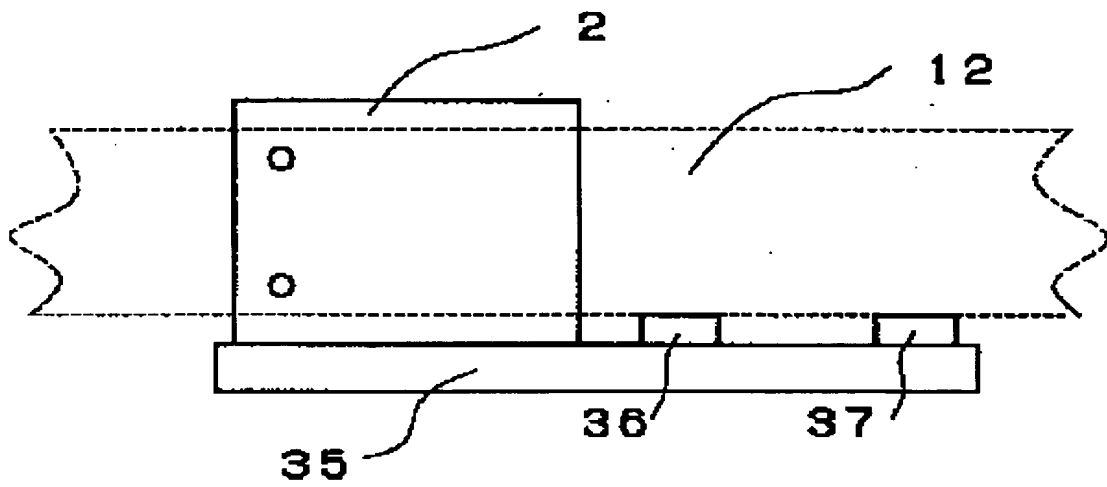


[Drawing 11]



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[Drawing 12]



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